

## **DRAFT**

### **ENGINEERING EVALUATION REPORT**

<b>Plant Name:</b>	<b>VERIZON WIRELESS - CALAVERAS</b>
<b>Application Number:</b>	<b>12658</b>
<b>Plant Number:</b>	<b>17049</b>

#### **Background:**

The applicant is applying for an Authority to Construct for a new Emergency Stand-By Diesel Power Generator. The applicant is requesting an Authority to Construct for the following equipment:

#### **S-1 Emergency Stand-By Diesel Generator; Generac/John Deere Model SD60/5030HF270, 96 BHP**

#### **CUMULATIVE EMISSION CALCULATIONS**

Emission factors for all criteria pollutants except SO<sub>2</sub> were provided by the engine manufacturer. (SO<sub>2</sub> emission factor from AP42, Chapter 3.3). They are as follows:

PM	0.089	g/bhp-hr
NO <sub>x</sub>	5.065	g/bhp-hr
CO	0.010	g/bhp-hr
TOC	0.343	g/bhp-hr
SO <sub>2</sub>	0.930	g/bhp-hr

The applicant requested operations for 26 hrs/year non-emergency use. This restriction is consistent with the California Air Resources Board Final Regulatory Order 17 CFR 93115, Air Toxic Control Measure for Stationary Compression Ignition Engines (December 4, 2004). The ATCM restricts operation of stationary emergency standby engines with diesel pm emission rates of 0.15 g/bhp-hr or less to no more than 50 hr/yr for maintenance and testing purposes see Attachment 1).

At a 26 hour/year testing and maintenance limitation, criteria emissions are as follows:

SOURCE S-1		PM10	NOX	CO	TOC	SO2
	BHP	G/BHP-HR	G/HR	G/HR	G/HR	G/HR
g/bhp-hr unabated	96	9	486	1	33	89
TOTAL LB/HR		0.02	1.07	0.00	0.07	0.20
LB/MGAL		3.62	206.15	0.41	13.96	37.85
TOTAL LB/DAY		0.45	25.73	0.05	1.74	4.72
TOTAL LB/26 HRS		0.94	53.60	0.11	3.63	9.84
TOTAL TPY		0.0005	0.027	0.000	0.002	0.005

All emission factors except SO2 from Manufacturer's Specifications

Emission factors for SO2 from AP 42, Chapter 3.3, Table 3.1

## **TOXIC RISK MODELING**

The District uses PM emissions as a proxy for toxic emission exposure to surrounding residential and industrial populations. A PM emissions level of 0.58 lbs/year automatically triggers a health risk assessment according to Regulation 2, Rule 5. At a maximum 50 hours per year permitted operation of this engine, this application exceeds a PM emission level of 0.58 lbs/year and so requires that a health risk assessment be performed.

An ISCST3 model for diesel PM10 exposure was run using ALV (local) meteorological data. Residential risk is based on a continuous 70-year exposure to annual average pollutant concentrations. Distance and directionality were used as the primary considerations to determine sites of maximum exposure. Both industrial and residential risks were considered in both urban and rural terrain settings.

The proposed generator is within 1000 feet of two schools, William Burnett Elementary School, and Calaveras Hills Continuation High School. Ground level concentrations of PM10 were calculated at the closest outer boundary of each of the schools. For students, the modeling assumptions include an increased breathing rate of approximately 10.5 m<sup>3</sup> per day, and exposures that are for 36 weeks per year over a 9-year period. The projected carcinogenic and non-carcinogenic risk levels at those point was determined to be significantly less than 1 in a million.

ISCST3 model runs were made for both rural and urban terrain inputs, each with and without raincaps. The modeling inputs and results are summarized in Attachment 2.

At 26 hr/year operation, the generator would result in a maximum annual average residential GLC of 0.00294 µg/m<sup>3</sup>, resulting in a carcinogenic risk of approximately 0.582 in a million. Associated health hazard indices are significantly less than 1.0 for all cases.

The maximum calculated carcinogenic risk is below 10 in a million and the maximum calculated chronic hazard index is less than 1.0, and so the generator as proposed is acceptable under the Regulation 2, Rule 5.

## **BACT/TBACT REVIEW**

Under Regulation 2, Rule 2, any new source which results in an increase of criteria pollutants must be evaluated for adherence to BACT control technologies. A BACT review is required if the engine emits more than 10 lbs/day of any criteria pollutant. Since NO<sub>x</sub> emissions exceed the trigger level of 10 lbs/day, a BACT review is required.

For compression ignition internal combustion engines, BACT requires that the engine must be fired on “California Diesel Fuel” (fuel oil with less than 0.05% by weight sulfur content, and less than 20% by volume aromatic hydrocarbons). BACT also requires that the engine emit no more than 6.9 g/bhp-hr of NO<sub>x</sub>. The proposed engine meets BACT requirements.

The engine must also meet TBACT under Regulation 2, Rule 5. TBACT is triggered for this engine as the PM<sub>10</sub> emissions exceed the trigger level of 0.58 lb/year. TBACT requires that the engine emit no more than 0.15 g/bhp-hr of PM. The proposed engine meets TBACT.

A summary of the toxic emissions for the engine other than PM<sub>10</sub> is shown in Attachment 3.

## **Compliance Determination:**

This generator is covered under ministerial exemption, Chapter 2.3 of the BAAQMD Permit Handbook. CEQA is not triggered for emergency stand-by generators under this provision.

This generator is also governed by the **California Air Resources Board’s Air Toxic Control Measure for Stationary Compression Ignition Engines, CCR Title 17, Section 93115**. The explicit annual equipment usage limitation of 26 hours per year except for operation under emergency conditions (Reg 9-8-330) will be included as part of the permit conditions.

The engine is exempt from emission limitations of District **Regulation 9, Rule 8-301 and 8-302**, “Nitrogen Oxides and Carbon Monoxide from Stationary Internal Combustion Engines,” since it meets the provisions of **Regulation 9, Rule 8-111.1**, (operation of less than 200 hours per year and firing rate of 1000 BHP or less).

Visible emissions will be required to meet Ringelmann 2.0 limitation per **Regulation 6-303**.

Sulfur emissions will be controlled by the requirement that any fuel used in the engine meet California Clean Air fuel content of 0.05% bw sulfur, per **Regulation 9-1**.

This is a new source, and no sources are proposed to be closed in connection with this application. The facility currently emits approximately 0.02 TPY of criteria pollutants (including the emissions from this application). No single source emits more than 1 TPY of PM<sub>10</sub> or SO<sub>2</sub> or 15 TPY of POC or nitrogen oxides. Therefore, the facility is not subject to emission offset requirements under Regulation 2-2-302 or 2-2-303.

**Conditions:**

Condition #22315, setting out the operating conditions and recordkeeping requirements for operations at Source S-1 shall be made part of the source's authority to construct/permit to operate.

**Recommendation:**

I recommend that an Authority to Construct be issued for the following source:

**S-1 Emergency Stand-By Diesel Generator, Generac/John Deere Model SD60/5030HF270, 96 BHP**

subject to Condition #22315.

By C. Fortney Date \_\_\_\_\_  
*PSD Evaluator*

COND# 22315 -----

1. Emergency stand-by generator S-1 shall be fueled exclusively by diesel fuel having a sulfur content no greater than 0.05% by weight. [Reg 9-1-304]
2. Emergency stand-by generator S-1 shall only be operated to mitigate emergency conditions or for reliability-related operations. Operations for reliability-related activities shall be limited to 26 hours per generator in any consecutive 12-month period. Operation while mitigating emergency conditions is unlimited. [CARB ATCM]
3. Emergency conditions are defined as any of the following:
  - a. Loss of regular natural gas supply
  - b. Failure of regular power supply
  - c. Flood mitigation
  - d. Sewage overflow mitigation
  - e. Fire
  - f. Failure of a primary motor, but only for such time as needed to repair or replace the primary motor [Reg 9-8-231]
4. Reliability-related activities are defined as any of the following:
  - a. Operation of an emergency stand-by engine to test its ability to perform for an emergency use
  - b. Operation of an emergency stand-by engine during maintenance of a primary motor [Reg 9-8-232]
5. The emergency stand-by engine shall be equipped with a non-resettable totalizing meter that measures and records the hours of operation for the engine. [Reg 9-8-530]
6. The following monthly records shall be maintained in a District-approved log for at least 2 years and shall be made available to the District upon request:
  - a. Total hours of operation for each generator
  - b. Total hours of operation under emergency conditions for each generator, and a description of the nature of the emergency condition
  - c. Total fuel usage for each generator [Reg 9-8-530]

## ATTACHMENT 1

### FINAL REGULATION ORDER

#### AIRBORNE TOXIC CONTROL MEASURE FOR STATIONARY COMPRESSION IGNITION ENGINES

(DECEMBER 4, 2004)

TABLE 1: SUMMARY OF THE EMISSION STANDARDS AND OPERATING REQUIREMENTS FOR NEW STATIONARY EMERGENCY STANDBY DIESEL-FUELED CI ENGINES > 50 BHP (SEE SUBSECTION (e)(2)(A)3.)				
DIESEL PM				OTHER POLLUTANTS
DIESEL PM STANDARDS (g/bhp-hr)	MAXIMUM ALLOWABLE ANNUAL HOURS OF OPERATION FOR ENGINES MEETING DIESEL PM STANDARDS			HC, NOx, NMHC+NOx, AND CO STANDARDS (g/bhp-hr)
	Emergency Use	Non-Emergency Use		
		Emission Testing to show compliance <sup>2</sup>	Maintenance & Testing (hours/year)	
≤0.15 <sup>1</sup>	Not Limited by ATCM <sup>3</sup>	Not Limited by ATCM <sup>3</sup>	50	Off-Road CI Engine Certification Standards for an off-road engine of the same model year and horsepower rating, or Tier 1 standards for an off-road engine of the same maximum rated power. <sup>4</sup>

1. Or off-road certification standard (title 13 CCR section 2423) for an off-road engine with the same maximum rated power, whichever is more stringent
2. Emission testing limited to testing to show compliance with subsections (e)(2)(A)3.
3. May be subject to emission or operational restrictions as defined in current applicable district rules, regulations, or policies.
4. The option to comply with the Tier 1 standards is available only if no off-road engine certification standards have been established for an off-road engine of the same model year and maximum rated power as the new stationary emergency standby diesel-fueled CI engine.

## ATTACHMENT 2

### ISCST3 RISK SCREENING RESULTS

APPLICATION #12658

VERIZON WIRELESS - CALAVERAS

P# 17049

SOURCE S-1			PM10	NOX	CO	TOC	SO2
	DESCRIPTION	BHP	G/BHP-HR	G/HR	G/HR	G/HR	G/HR
g/bhp-hr unabated	GENERATOR	96	0.089	5.065	0.010	0.343	0.930
TOTAL G/HR			9	486	1	33	89
TOTAL LB/HR			0.02	1.07	0.00	0.07	0.20
LB/MGAL			3.62	206.15	0.41	13.96	37.85
TOTAL LB/DAY			0.45	25.73	0.05	1.74	4.72
TOTAL LB/50 HRS			0.94	53.60	0.11	3.63	9.84
TOTAL TPY			0.0005	0.027	0.000	0.002	0.005

All emission factors except SO2 from Manufacturer's Specifications

Emission factors for SO2 from AP 42, Chapter 3.3, Table 3.1

1.354E-05                      g/sec at 50 hrs/year permitted usage

SOURCE 1 - NO RAINCAP

50HR/YR

USE "ALV" MET DATA

RURAL TERRAIN	Max annual avg ambient conc (µg/m3)	Diesel PM Unit Risk (µg/m3)-1	Diesel PM Chronic REL (µg/m3)	Exposure Factor	Max Cancer Risk/MM	Max Chronic HI
Residential	2.90E-04	3.00E-04	5.00E+00	1	0.09	5.80E-05
Industrial	2.03E-03	3.00E-04	5.00E+00	0.66	0.40	4.06E-04
William Burnett Elem	3.00E-05	3.00E-04	5.00E+00	0.18	0.002	6.00E-06
Calaveras Hills HS	2.00E-05	3.00E-04	5.00E+00	0.18	0.001	4.00E-06

URBAN TERRAIN	Max annual avg ambient conc (µg/m3)	Diesel PM Unit Risk (µg/m3)-1	Diesel PM Chronic REL (µg/m3)	Exposure Factor	Max Cancer Risk/MM	Max Chronic HI
Residential	2.30E-04	3.00E-04	5.00E+00	1	0.07	4.60E-05
Industrial	1.19E-03	3.00E-04	5.00E+00	0.66	0.24	2.38E-04
William Burnett Elem	4.00E-05	3.00E-04	5.00E+00	0.18	0.002	8.00E-06
Calaveras Hills HS	1.20E-04	3.00E-04	5.00E+00	0.18	0.006	2.40E-05

SOURCE 1 - WITH RAINCAP  
USE "ALV" MET DATA

50HR/YR

RURAL TERRAIN	Max annual avg ambient conc (µg/m3)	Diesel PM Unit Risk (µg/m3)-1	Diesel PM Chronic REL (µg/m3)	Exposure Factor	Max Cancer Risk/MM	Max Chronic HI
Residential	2.40E-04	3.00E-04	5.00E+00	1	0.072	0.00005
Industrial	2.94E-03	3.00E-04	5.00E+00	0.66	0.582	0.00059
William Burnett Elem	4.00E-05	3.00E-04	5.00E+00	0.18	0.002	0.00001
Calaveras Hills HS	1.50E-04	3.00E-04	5.00E+00	0.18	0.008	0.00003

D = 0.0635  
V = 79.455  
Ds = 17.886  
Vs = 0.001

URBAN TERRAIN	Max annual avg ambient conc (µg/m3)	Diesel PM Unit Risk (µg/m3)-1	Diesel PM Chronic REL (µg/m3)	Exposure Factor	Max Cancer Risk/MM	Max Chronic HI
Residential	2.60E-04	3.00E-04	5.00E+00	1	0.08	5.20E-05
Industrial	1.32E-03	3.00E-04	5.00E+00	0.66	0.26	2.64E-04
William Burnett Elem	4.00E-05	3.00E-04	5.00E+00	0.18	0.00	8.00E-06
Calaveras Hills HS	1.30E-04	3.00E-04	5.00E+00	0.18	0.01	2.60E-05

D = 0.0635  
V = 79.455  
Ds = 17.886  
Vs = 0.001



## ATTACHMENT 3

### SUMMARY OF TOXIC EMISSIONS

A#12658 - VERIZON WIRELESS

Small Generator Emissions

Engine Size =	96 BHP	
Hourly Diesel Usage =	5.2 GPH	
Hourly Diesel Usage =	0.005 MGAL/HR	
Annual Diesel Usage =	0.260 MGAL/YR	at 50 hrs/yr maintenance & testing
=	36.40 MMBTU/YR	

POLL	POLL NAME	CAS	BAAQMD Trigger (lb/yr)	Emission Factor (lb/MM BTU)	TOTAL EMS (lb/yr)	EMS > TRIGGER LEVEL ?
41	Benzene	71-43-2	6.7	9.33E-04	0.03	NO
60	Carbon tetrachloride	56-23-5	4.6			
124	Formaldehyde	50-00-0	33	1.18E-03	0.04	NO
148	Hexane	110-54-3	39000			
179	Methyl alcohol	67-56-1	120000			
182	1,1,2-trichloroethane	79-00-5	12			
263	Styrene	100-42-5	135000			
293	Toluene	108-88-3	38600	4.09E-04	0.01	NO
307	Xylene	1330-20-7	57900	2.85E-04	0.01	NO
314	1,1-Dichloroethane	75-34-3	120			
333	Ethyl benzene	100-41-4	190000			
335	Acetaldehyde	75-07-0	72	7.67E-04	0.03	NO
386	Naphthalene	91-20-3	270	8.48E-05	0.00	NO
390	Chloroform	67-66-3	36			
396	Methylene chloride	75-09-2	190			
420	Ethylene dibromide	106-93-4	2.7			
512	Acrolein	107-02-8	3.9	9.25E-05	0.00	NO
518	Vinyl chloride	75-01-4	2.5			
520	Chlorobenzene	108-90-7	13500			
521	1,3-butadiene	106-99-0	1.1	3.91E-05	0.00	NO
781	1,1,2,2-tetrachloroethane	79-34-5	3.3			
1030	Arsenic	7440-38-2	0.024			
1040	Beryllium	7440-41-7	0.015			
1070	Cadmium	7440-43-9	0.046			
1110	Copper	7440-50-8	463			
1140	Lead	7439-92-1	29			
1160	Manganese	7439-96-5	77			
1190	Mercury	7439-97-6	57.9			
1180	Nickel	7440-02-0	0.73			
1220	Selenium	7782-49-2	96.5			
1320	Zinc	7440-66-6	6760			
1860	PAH (benzo[a]pyrene equiv)		0.043	1.68E-04	0.01	NO

Toxic Emission Factors From AP-42, Chapter 3.3, "Speciated Organic Compound Emission Factors for  
for Uncontrolled Diesel Engines," October 1996